

BNL/HOWARD Studies of Proton and Nuclear Structure at RHIC

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Where is RHIC?

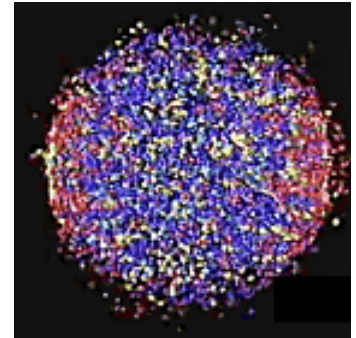
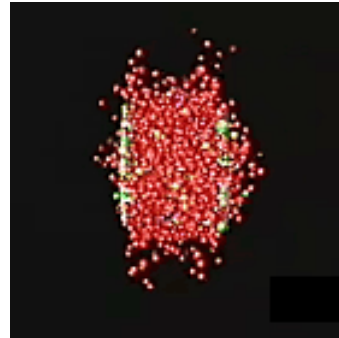
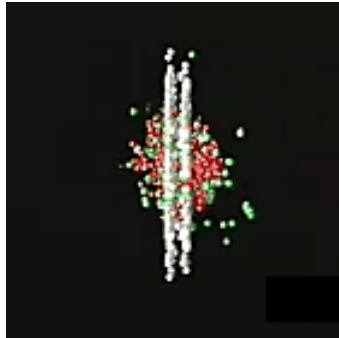


RHIC = Relativistic Heavy Ion Collider

Where is RHIC?



What is RHIC?



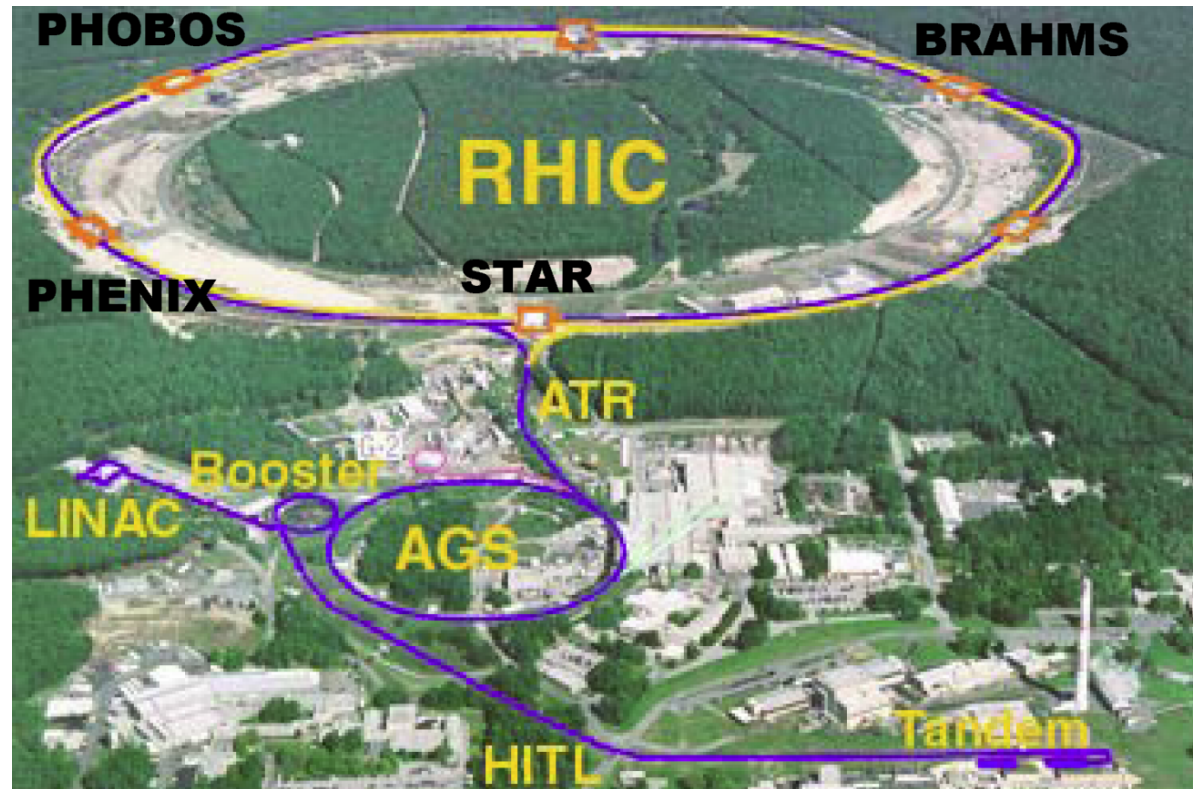
Detectors and Experiments at RHIC

- PHENIX
- STAR
- PHOBOS
- BRAHMS



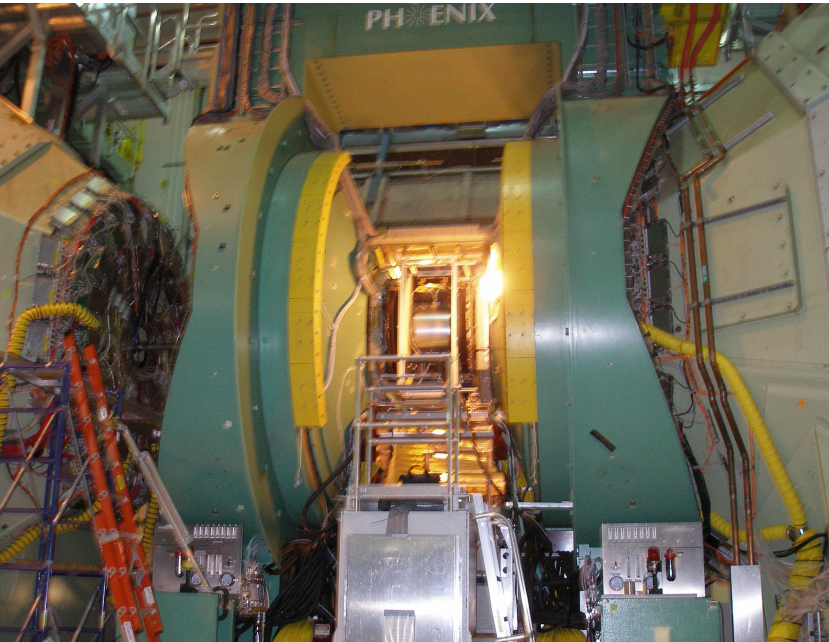
Detectors and Experiments at RHIC

- PHENIX
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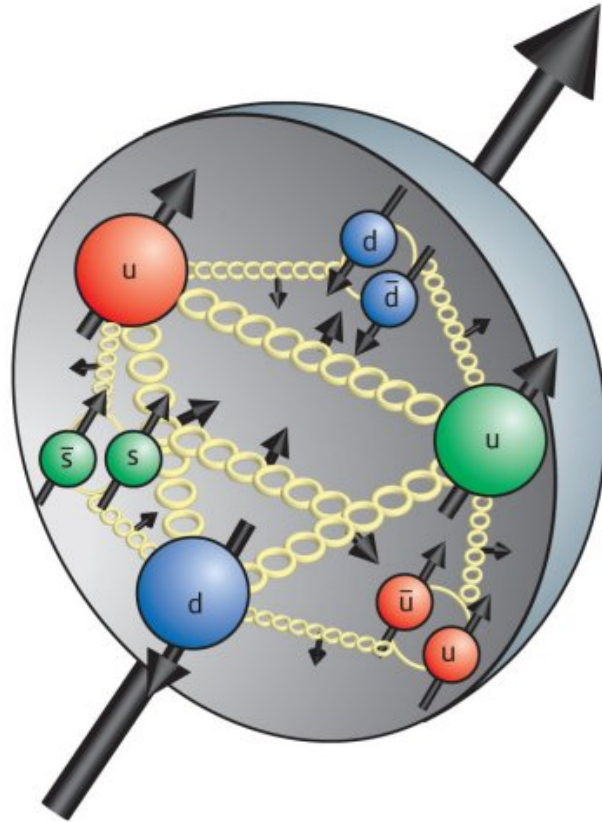


PHENIX

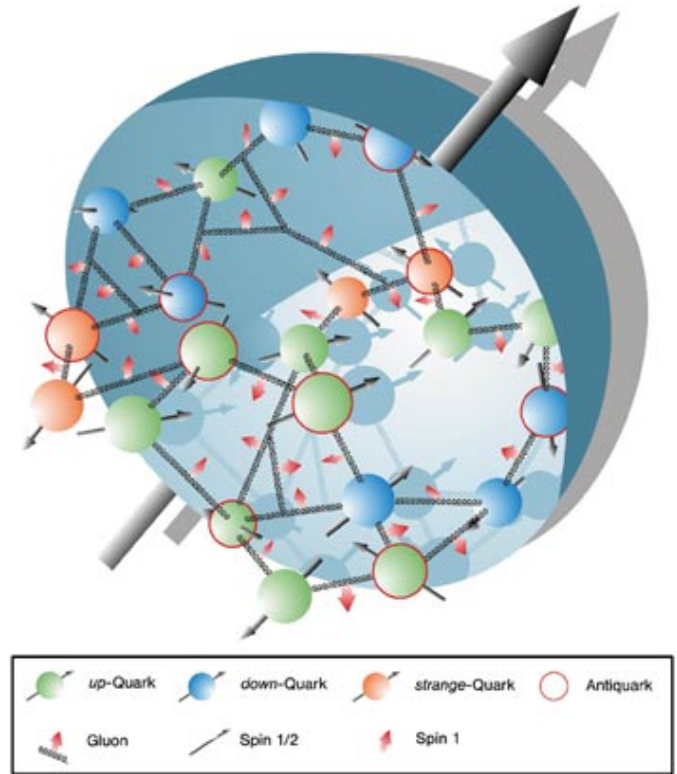
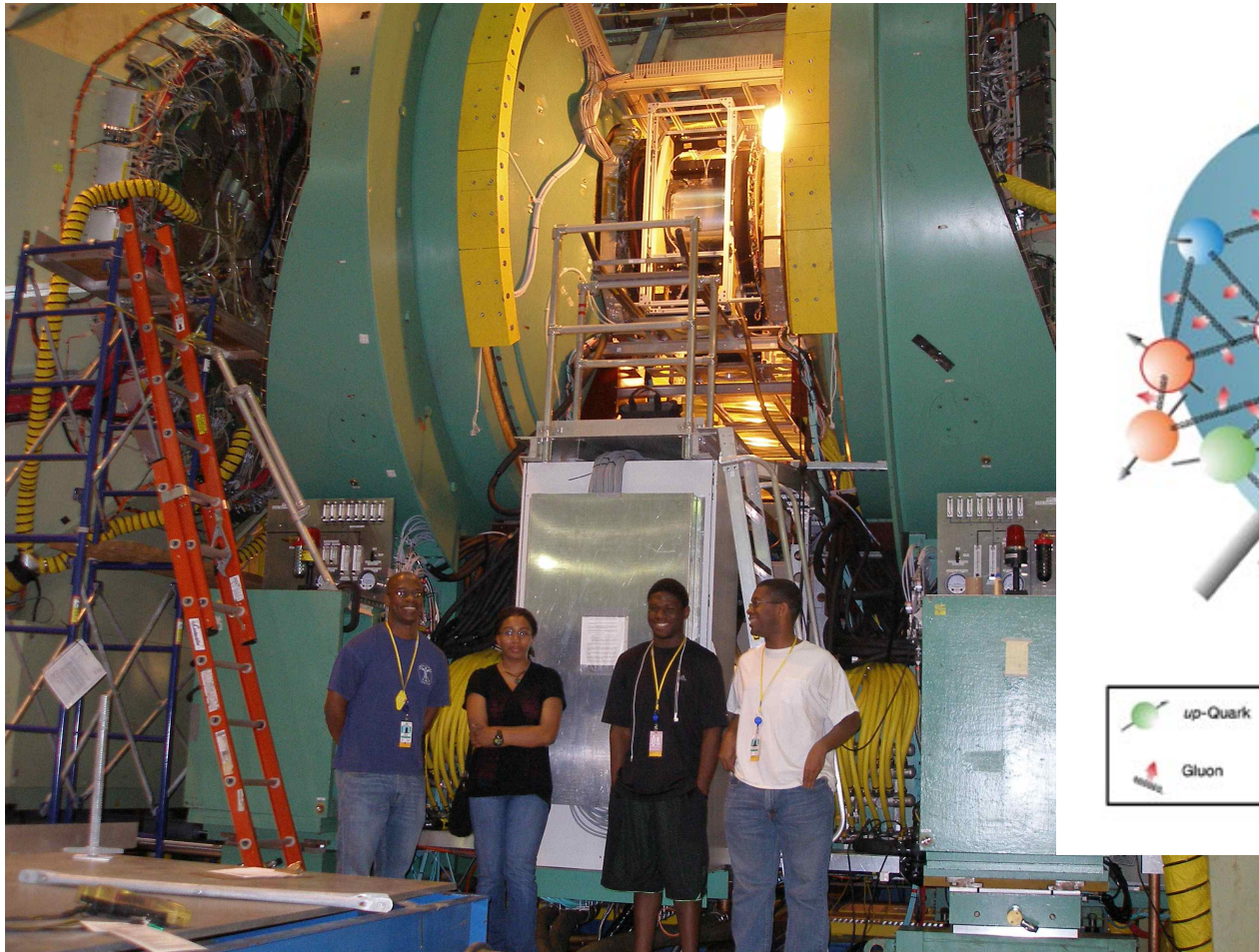
PHENIX=Pioneering High Energy
Interaction eXperiment



What's up with the Proton's Spin?



What does PHENIX have to do with the spin problem?



Possible methods: FAST TOF Detector

Cheaper **Choices**

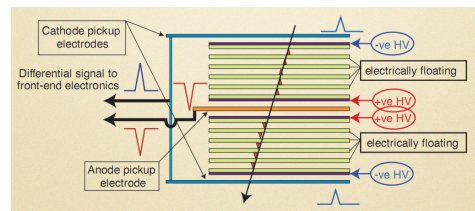


Faster

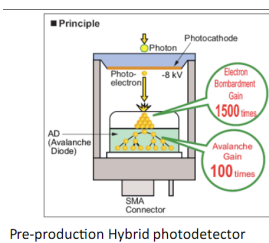
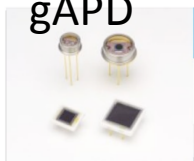


PHENIX TOF.E (scint)
Year <2000 technology

~80 ps mRPC

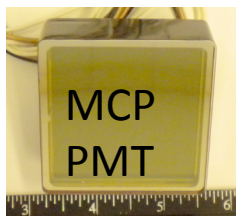


gAPD

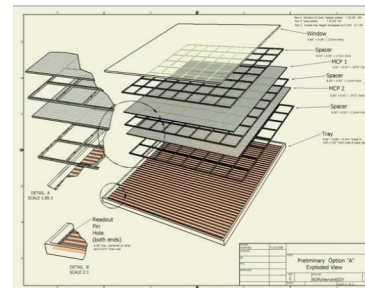
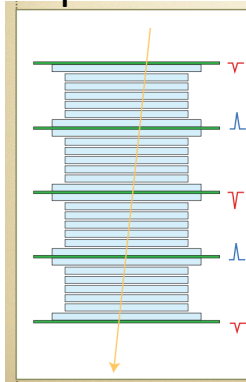


Pre-production Hybrid photodetector

HPD



~16 ps mRPC



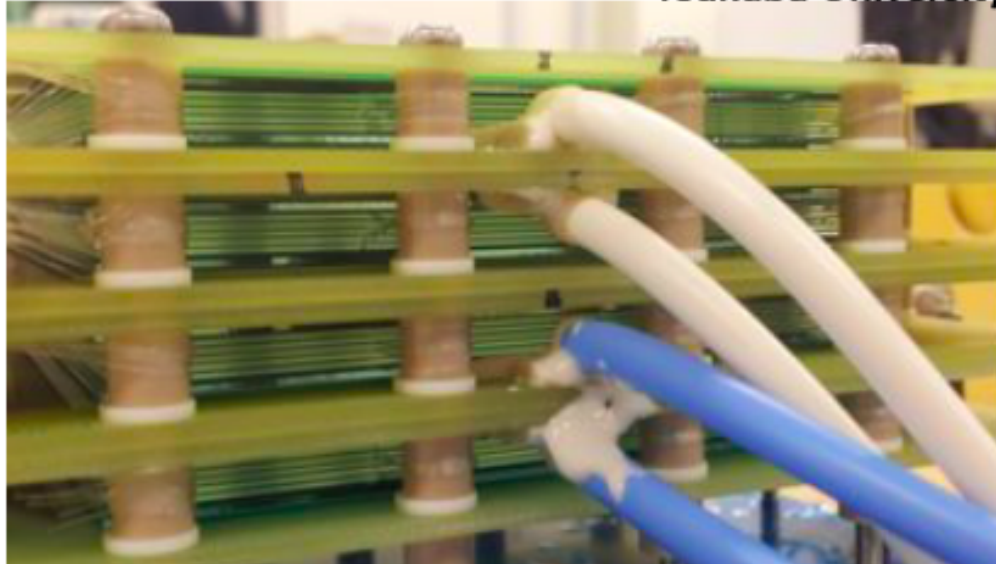
10ps LAPPD

MCP-PMT, 16 mRPC could be used in PHENIX upgrades

LAPPD very intriguing and awaiting final results (3 year \$3M proposal led by UChicago).

4-stack Glass Multi-gap Resistive Plate Chamber

Tsukuba University



BNL, UIUC, Howard

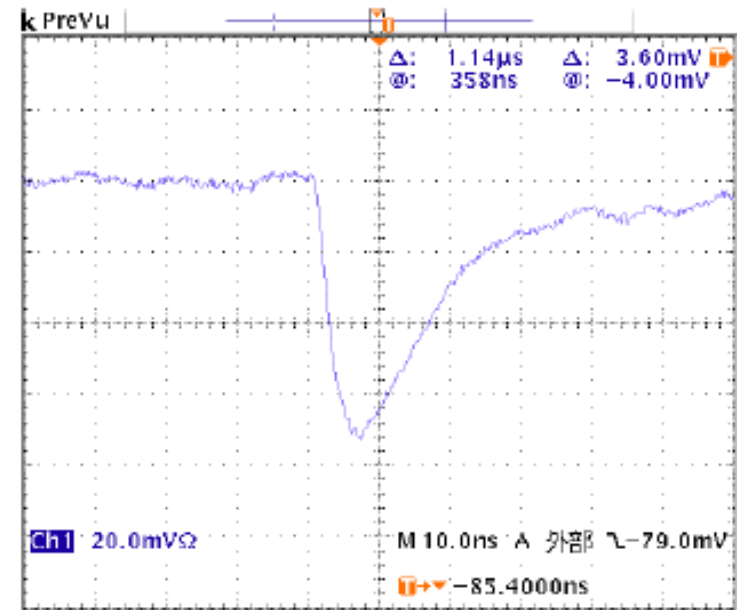
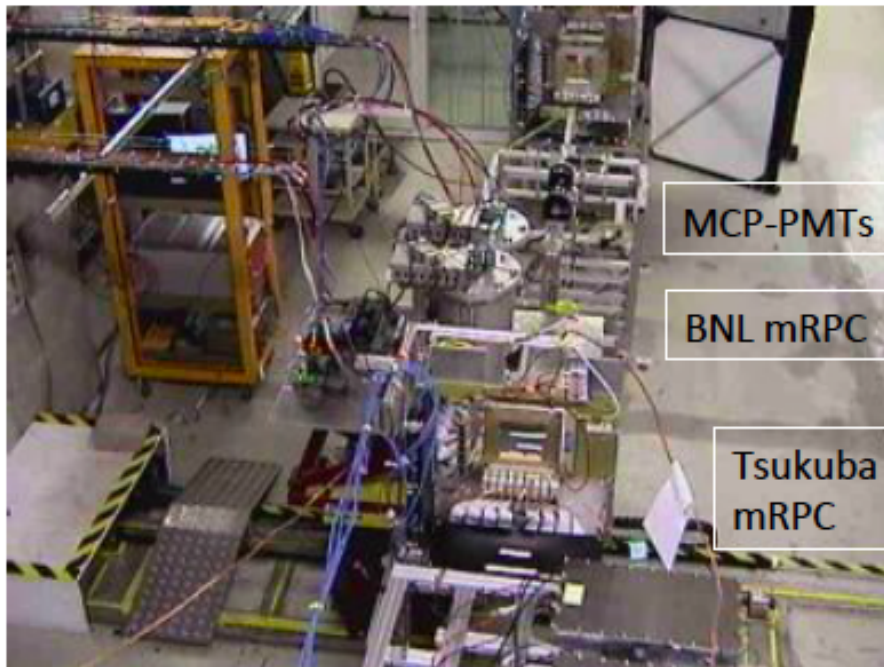
- ✓ Made of glass plates separated by fishing wire
- ✓ Gap width : $\sim 165\mu\text{m}$ (Tsukuba) or $\sim 200\mu\text{m}$ (BNL)
- ✓ 6 gap/stack
- ✓ $6 \times 4 = 24$ gap



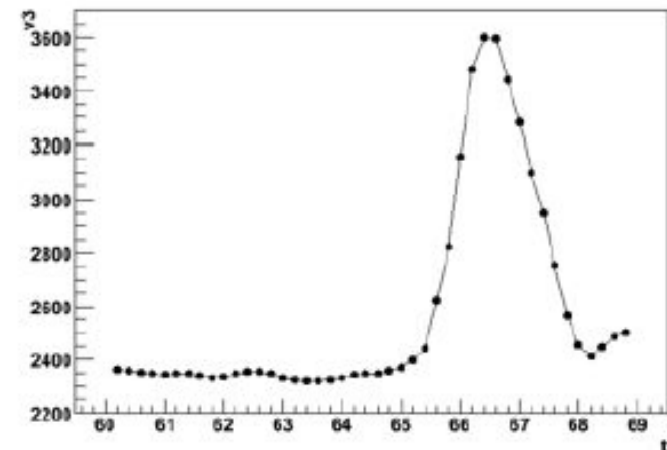
- ✓ Advantages:
 - Very cheap materials
 - Very good performance (20 ps?)

We're studying the time resolution and efficiency as a function of

- ✓ High voltage
- ✓ Vertical position
- ✓ Gas mixture ratio
- ✓ Gain of pre-amp

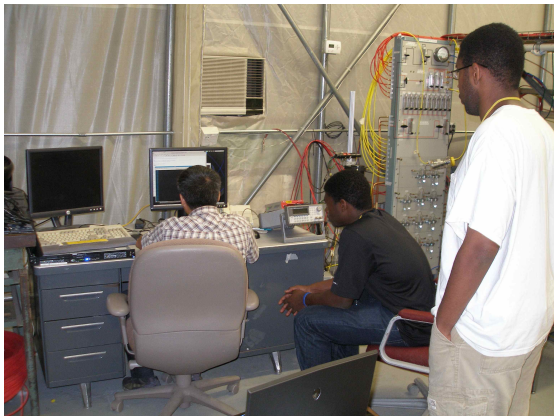
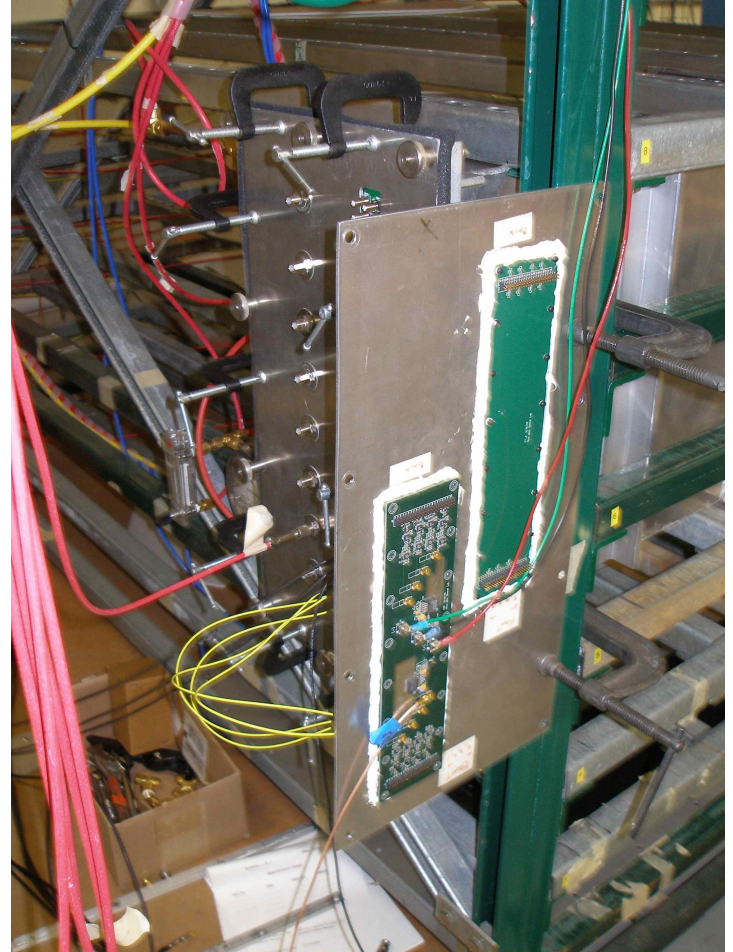


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Very fast rise times possible!

Where are we now?



- Thank you for listening!